Education Discussion Paper

10/79: COMPUTER LITERACY IN THE SCHOOLS OF B.C.

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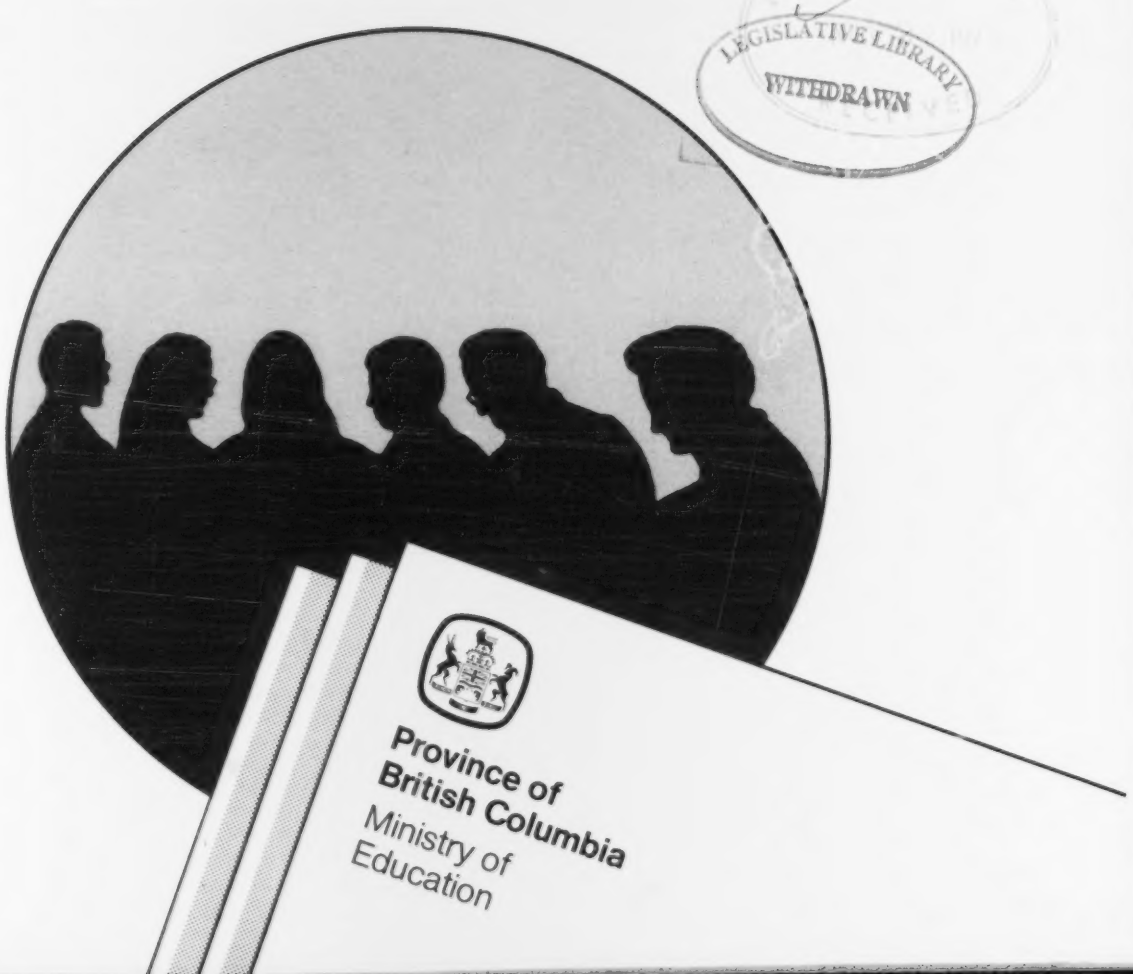

PROVINCE OF BRITISH COLUMBIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

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EDUCATIONAL COMPUTING

DISCUSSION PAPER 10/79
COMPUTER LITERACY IN THE SCHOOLS OF B.C.

by

Wm. P. Goddard

A. E. Wright

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The following is a discussion paper which has evolved from the work presently being conducted by J.E.M. Projects on behalf of the Ministry of Education, Science and Technology. Its purpose is to obtain reaction to the ideas presented.

We encourage you to complete, detach and mail this form to the J.E.M. Projects office, Discovery Park, Box 1700, Victoria, B.C. V8W 2Y2, or call Dr. A. E. Wright, Research Director, J.E.M. Projects at (604) 477-7246.

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1.0 INTRODUCTION

The purpose of this Paper is to promote discussion within the education community on the whole question of computer literacy and how it might be promoted in the schools of the province.

By computer literacy is meant general familiarity and ease with computers, their uses and their application to ordinary, everyday living. Specialized programs for the training of analysts and programmers is not of concern here.

2.0 BACKGROUND

The Conference Board of the Mathematical Sciences reports: "The average citizen hasn't the foggiest idea of how computers work and how pervasive their influence really is. Consequently, he has no idea of what to do when a computer system makes a mistake, he has no idea how to vote on issues involving computers (e.g., national data banks): he is, in short, culturally disadvantaged."

Yet, technology is advancing so rapidly that very shortly a working knowledge of computers will be necessary for us all if we are to function adequately as citizens.

It is only through the education system that computer literacy can be effectively dealt with, but the present use of computers in schools is unwittingly non-supportive of promoting literacy. Although there are notable exceptions, the following generally apply:

(1) There are only enough teachers and equipment to provide special computer courses at the upper high school level;

(2) School computers are generally considered to be the province of the high school mathematics department;

(3) A mythology has developed around computers - they are unfamiliar, difficult and require a special kind of brain power;

(4) Applications to areas other than mathematics has been limited;

(5) Because information on new hardware and software applications is not made available to all subject area teachers, there has been little opportunity to be creative in the use of computers in schools.

3.0 THE MECC APPROACH

The Minnesota Educational Computing Consortium, supported by the National Science Foundation, has developed a Computer Literacy Questionnaire for which normative data have been established.

Unlike much of the content in school curricula, the questionnaire is culture-free, that is, the questions reflect the same concerns about computers which are just as true of Canada as they are of the United States, or of Minnesota in particular.

Altogether ninety-seven questions are asked:

Part I. (48 questions) measures affective goals.
e.g. "I feel uneasy when I am with people who are talking about computers - STRONGLY DISAGREE, DISAGREE, UNDECIDED, AGREE, STRONGLY AGREE."

Part II. (46 questions) measures cognitive goals.
e.g. "Computers are used to commit crimes - TRUE, FALSE, I DON'T KNOW."

e.g. "The most questionable use of large computer files is: (a) government planning, (b) research, (c) checking on people, (d) administration of social problems, (e) I don't know."

e.g. "Computer software is a term describing:
(a) computer programs, (b) electronic components,
(c) people who work with computers, (d) mechanical and electronic parts of a computer, (e) I don't know."

e.g. "Choose the correct final output for the procedure described below:

1. List the three names Brown, Anderson, Crane in alphabetical order.
2. Remove the last name from the list.
3. If only one name is left, stop. Otherwise, go on to step 4.
4. List the remaining names in reverse order.
5. Go back to step 2.

Output (a) Anderson, Brown, Crane
(b) Brown
(c) Anderson, Brown
(d) Anderson
(e) Crane

Part III. (3 questions) measures programming skills.

e.g. "When run on a computer, the following program will:

1. Input A, B, C, D, E
2. Let S = A + B + C + D + E
3. Let M = S/5
4. Sprint S, M
5. End

a) Calculate the sum of 5 values
b) Calculate the average of 5 values
c) Print sum & average of 5 values
d) All of above
e) I don't know."

(The complete questionnaire is appended.)

3.1 GOALS

The goals suggested by such questions are representative of the computer literacy goals prescribed by a wide variety of persons from government, business industry, and higher education. On the basis of student results on this questionnaire, programs are considered successful or not. This questionnaire could be used in British Columbia and the results compared with the normative data base which has been established. (MECC only requests that users share their data). It is obvious from the few questions cited that many sort of things are supposed to result from computer instruction. How computer literate are B.C. students?

The computer literacy goals of MECC are applicable to all parts of the state education system. That is, computer literacy is not considered merely at the level of high school mathematics but at all levels and in all subject areas where computer knowledge may appropriately enhance the program. Computer literacy is the justification for the purchase of four hundred micro computers to use as either "stand alones" or inexpensive terminals, and the intention to purchase many more. With this purchase, the Minnestoa education system is no longer so dependent on time-shared computing.

3.2 OPERATIONS

The Minnesota Educational Computing Consortium makes available hardware and software at bulk discount prices to the state schools. In addition, it services the machines, where possible, from a parts exchange. Combined with the use of the Computer Literacy Questionnaire, MECC has been instrumental in considerably raising the literacy rate in Minnesota.

The micro computers are not considered the particular specialization of one subject or one group of educators. Rather than being content-substantive, they are used as tools to enhance a number of subject areas and to allow learning experiences which were never possible before. Some examples of what has been found possible with other systems and in other regions, illustrates this point.

In Sunnyvale, California, pupils teach other pupils how to program computers. Sunnyvale students also engage in such simulations as "Whale Watching", in which they help a southward-migrating gray whale make the necessary navigational and survival decisions to reach the Baja breeding grounds. One effect of the computer is to create worlds of "If" for children to explore. In Brookline Mass., almost 1.5 million has been spent teaching sixth graders to program computers for math, language, music making and, says Seymour Pappert, "thinking skills". At Dartmouth College, 96% of this year's graduating class use computers which are as freely available as library stacks. Consultant John Nevision says, "Learning to write a computer program must now be considered part of becoming a liberally educated person." In Illinois, a system known as PLATO helps teach 150 subjects ranging from Swahili to rocketry. It's proteges praise PLATO for "kindness" and "personalized attentions".

4.0 COMMENT

A number of questions need to be asked about computer literacy in the schools of British Columbia: - are B.C. students being "left behind" by other regions? Just how should we go about "teaching" computer literacy? How can the first steps be taken?

Joint Educational Management Projects is continuing its investigations into the whole area of school-based computer applications and welcomes reactions, particularly from school personnel.